

## **SOUTH DAKOTA STATEWIDE FISHERIES SURVEY**

**2102-F21-R-40**

Name: Cold Brook Reservoir County: Fall River  
Legal description: T7S, R5E, Sec.11 & 28  
Location from nearest town: 0.5 miles north of Hot Springs, SD  
Dates of present survey: October 27, 2007  
Date last surveyed: September 30, 2002  
Most recent lake management plan: F-21-R-38 Date: 2005  
Management classification: Coldwater Permanent  
Contour mapped: Date 1992

Primary Species: (game and forage)

1. Rainbow Trout
2. Largemouth Bass

Secondary and other species:

1. Black Crappie
2. Green Sunfish

### **PHYSICAL CHARACTERISTICS**

Surface Area: 32 acres; Watershed: 40,704 acres  
Maximum depth: 38 feet; Mean depth: 15 feet  
Lake elevation at survey (from known benchmark): full

#### **1. Describe ownership of lake and adjacent lakeshore property:**

Cold Brook Reservoir is owned by the Bureau of Reclamation (BOR) and managed for flood control and recreation. There are camping, picnicking, boating and swimming facilities located on or adjacent to the reservoir. South Dakota Game, Fish and Parks manages the fishery.

#### **2. Describe watershed condition and percentages of land use:**

The watershed above Cold Brook Reservoir is primarily private land used as pasture. Large areas of public land administered by the U.S. Forest Service and U.S. National Park Service are located in the upper watershed. Erosion has contributed a significant amount of silt at the inlet of the reservoir.

#### **3. Describe aquatic vegetative condition:**

Emergent vegetation in the form of cattail and bulrush exists in the inlet region. Submergent vegetation, which is dominated by Chara spp., was evident over much of the bottom to depths of light penetration.

**4. Describe pollution problems:**

Moderate sedimentation is occurring in the inlet area.

**5. Describe condition of all structures, i.e. spillway, level regulators, boat ramps, etc.:**

All structures associated with Cold Brook Reservoir appear adequate and in good condition. Cold Brook has a brand new boat ramp.

## **CHEMICAL DATA**

No chemical data was done during the electrofishing survey.

## **BIOLOGICAL DATA**

### **Methods**

Night electrofishing was conducted at Coldbrook Lake on October 23, 2007. Electrofishing was conducted using a Smith-Root unit with pulsed-DC. Four, 10-minute sights were completed during the survey. All largemouth bass were collected, measured for total length (TL; mm) and weighed (g). In addition, scale samples were collected from up to 5 fish per centimeter group for age and growth analysis. All data was entered into WinFin 2.95 (Francis 1999).

Fish population parameters, confidence intervals and standard errors were computed using WinFin Analysis (Francis 2000). Parameters calculated were catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr) based on length categories. Abundance was expressed as the mean catch per unit effort (CPUE; mean number per net night or mean number per hour of electrofishing). Actual pedal time (time the electrofishing unit produced current) was recorded from the digital display on the Smith-root control box and used to calculate electrofishing CPUE. Population structural characteristics were expressed as length frequency histograms and stock density indices (PSD and RSD-P). Fish condition was expressed as mean Wr.

## **RESULTS AND DISCUSSION**

### **Fish Community Survey**

#### *Night electrofishing Catch*

Cold Brook Reservoir was night electrofished for a total of 2,400 seconds pedal time. Only largemouth bass (N=188) were targeted (Table 1).

**Table 1.** Total catch (N), catch per hour of electrofishing (CPUE; 80% CI's in parentheses), catch per hour of stock length fish (CPUE-S; 80% CI's), and proportional stock densities (PSD, RSD-P; 90% CI's) for largemouth bass collected by electrofishing in Cold Brook, Fall River County, October 23, 2007

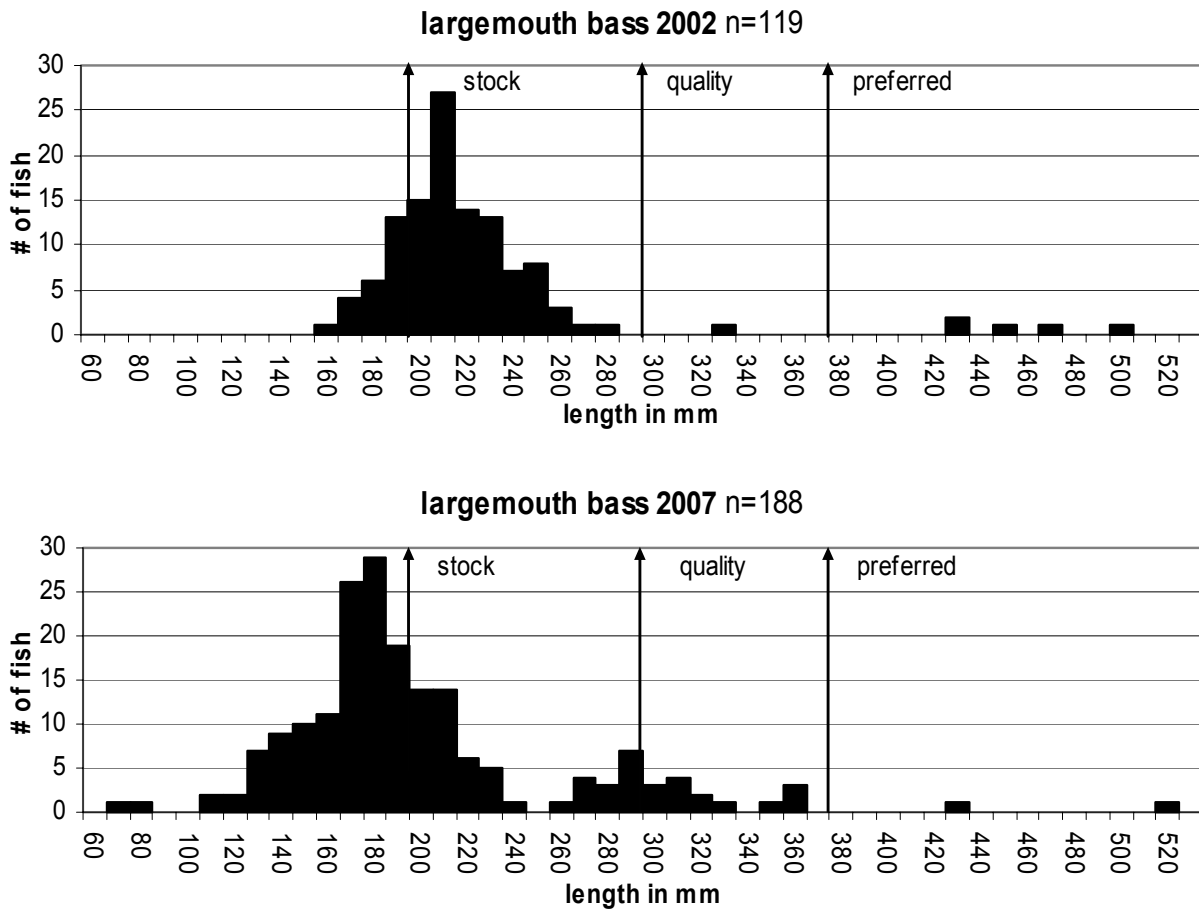
Species	N	CPUE	CPUE-S	PSD	RSD-P	Wr $\geq$ S
Largemouth bass	188	282.0 (47.1)	106.5 (36.9)	23 (9)	3 (3)	92.4 (0.7)

**Table 2.** Total catch (N), pedal time (seconds), catch per hour of electrofishing (CPUE), mean total length (TL, standard error is given in parentheses), proportional stock densities (PSD, RSD; 90% confidence intervals are given in parentheses) and condition factor (Wr for fish  $\geq$  stock length; 80%CI's) for largemouth bass collected by electrofishing in Cold Brook, Fall River County, 2002, 2007.

Year	N	Pedal Time (sec)	CPUE	CPUE-S	PSD	RSD-P	Wr $\geq$ S
2002	119	1,694	252 (113)	201 (102)	6 (4)	5 (4)	91 (1)
2007	188	2,400	282 (47)	107 (37)	23 (9)	3 (3)	92 (1)

### Largemouth bass

Cold Brook has a very abundant bass population with a stock length and greater CPUE of 107 fish per hour compared to 201 in 2002 (Table 2). Size structure was larger with a PSD of 23 and an RSD-P of 3 compared to 6 and 5 in 2002, respectively. Fish condition was low for all stock length and larger bass with a mean Wr of 92 (Table 2). As expected, growth was very slow, taking over 4 years to reach stock length (8 inches) (Table 3). Game, Fish & Parks personnel removed many small bass from Coldbrook and moved them to a low density population on the prairie. This practice will continue as these fish are not providing any benefits to the trout fishery, which is the current management of Coldbrook. If anything, removing large numbers of small bass may increase bass size structure and provide a more quality bass fishery.



**Figure 1.** Length histogram of largemouth bass collected during night electrofishing from Cold Brook, Fall River County, 2002, 2007.

**Table 3.** Cold Brook Reservoir largemouth bass year class, age in 2007, sample size (N), mean back-calculated total length at age, population standard error (SE), Region 1 mean length at age, and the South Dakota largemouth bass mean length at age (Willis et al. 2001).

Year Class	Age	N	1	2	Age 3	4
2006	1	8	81			
2005	2	24	72	127		
2004	3	18	72	128	174	
2003	4	5	73	111	161	190
<b>Mean (SE)</b>			<b>74 (2)</b>	<b>122 (5)</b>	<b>168 (7)</b>	<b>190 (0)</b>
Region 1 Mean			78	154	214	272
S.D. Mean			96	182	250	305

## LITERATURE CITED

- Francis, J. 1999. Winfin, Version 2.95; Microsoft Access Program for data entry. Nebraska Game and Parks Commission, Lincoln.
- Francis, J. 2000. WinFin Analysis Program. Version 1.5. Nebraska Game and Parks Commission, Lincoln.
- Willis, D.W., D.A. Isermann, M.J. Hubers, B.A. Johnson, W.H. Miller, T.R. St. Sauver, J.S. Sorenson, E.G. Unkenholz, and G.A. Wickstrom. 2001. Growth of South Dakota Fishes: A Statewide Summary with means by region and Water Type. Special Report. South Dakota Department of Game, Fish and Parks. Pierre, South Dakota.

## RECOMMENDATIONS

1. Continue to use Cold Brook as an adult largemouth bass source for other lakes.
2. Evaluate the success of the rainbow trout fishery in the presence of an extremely high density largemouth bass population

## APPENDICES

### **Appendix A.** Stocking record for Coldbrook Reservoir, Fall River County, 1999-2007.

Year	Species	Number	Size
1999	Rainbow Trout	5,250	Catchable
	Rainbow Trout	25	Adult
2000	Rainbow Trout	4,500	Catchable
2001	Rainbow Trout	6,730	Catchable
	Rainbow Trout	25	Adult
2002	Rainbow Trout	5,272	Catchable
	Rainbow Trout	70	Adult
2003	Rainbow Trout	5,250	Catchable
	Rainbow Trout	11	Adult
2004	Rainbow Trout	4,680	Catchable
	Rainbow Trout	214	Adult
2005	Rainbow Trout	5,060	Catchable
2006	Rainbow Trout	9,500	Catchable
	Rainbow Trout	300	Adult
2007	Rainbow Trout	6,800	Catchable
	Rainbow Trout	70	Adult